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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/967,187 | 09/28/2001 | Gregory E. Howard | TI-29894 | 5978 |

23494 7590 02/27/2002

TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER

SOWARD, IDA M

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2822

DATE MAILED: 02/27/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/967,187

Applicant(s)

HOWARD ET AL.

Examiner

Ida M Soward

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

This office action is in response to the preliminary amendment filed 28 September 2001.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Momose (5,198,692).

Momose teaches a bipolar junction transistor, comprising: a buried collector layer **2**; a counterdoped collector region **3** adjacent to the buried collector layer; a base region **4** adjacent to the counterdoped collector region; and an emitter region **5** adjacent to the base region (Figures 1A-1C).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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Claims 2, 4-6 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Momose (5,198,692) in view of Kabir et al. (US 6,346,452 B1).

Momose teaches all mentioned in the rejection above. However, Momose fails to teach at least one of the dopant species in the collector region having a dopant concentration greater than $0.5 \times 10^{17} \text{cm}^{-3}$, a SiGe base, and types of scattering centers. Kabir et al. teach that at least part of the collector region has a doping concentration of $2 \times 10^{17} \text{cm}^{-3}$, a SiGe base (col. 5, lines 7-14) and neutral phosphorus scattering centers (cols. 2-3, lines 66-67 & 1-42, respectively). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the BJT structure of Momose by incorporating the collector doping concentration, SiGe base and phosphorus scattering centers of Kabir et al. to increase the frequency performance of bipolar transistors.

Claims 3 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Momose (5,198,692) and Kabir et al. (US 6,346,452 B1) as applied to claims 1 and 5 above, and further in view of Prior Art Figure 1.

Momose and Kabir et al. teach all mention in the rejections above. However, Momose and Kabir et al. fail to teach a distance from the edge of the buried collector region to the edge of the base region which is adjacent to the collector region as claimed in the present invention. Prior Art Figure 1 teaches the same buried collector edge to base region edge distance **70** as the distance **90** of the claimed embodiment of Figure 2. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the BJT structure of Momose and the

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collector doping concentration, SiGe base and phosphorus scattering centers of Kabir et al. with the buried collector edge to base region edge distance of Prior Art Figure 1 to achieve optimal device operation.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to a bipolar junction transistor, comprising: a buried collector layer ; a counterdoped collector region adjacent to the buried collector layer; a base region adjacent to the counterdoped collector region; and an emitter region adjacent to the base region:

Hastings et al. (6,034,413) Jang (5,882,966)

Jerome et al. (5,420,050) Singer et al. (4,639,761).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ida M Soward whose telephone number is 703-305-3308. The examiner can normally be reached on Monday - Friday, 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.


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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ims
February 22, 2002


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800